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## Chrysotile Asbestos and Mesothelioma

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The Editor's Summary for the article by Tse et al. (2010) stated the following:

Assuming an average latency of 42 years, the authors predict that incidence rates will peak in 2009 and that diagnoses will peak in 2014. However, they caution that ongoing use of chrysotile asbestos (which has been implicated but not conclusively established as a cause of mesothelioma) and the release of asbestos fibers from older buildings during demolition or renovation may slow the projected decline.

The statement concerning chrysotile asbestos being "implicated but not conclusively established as a cause of mesothelioma" is inconsistent with current scientific opinion. I refer you to the most recent evaluation by the International Agency for Research on Cancer in which Straif et al. (2009) stated,

Epidemiological evidence has increasingly shown an association of all forms of asbestos (chrysotile, crocidolite, amosite, tremolite, actinolite, and anthophyllite) with an increased risk of lung cancer and mesothelioma. Although the potency differences with respect to lung cancer or mesothelioma for fibres of various types and dimensions are debated, the fundamental conclusion is that all forms of asbestos are "carcinogenic to humans" (Group 1).

In addition, opinions such as that expressed in the Editor's Summary are advanced only by scientists with prochrysotile industry bias.

When I wrote the draft for the first *IARC Monograph* on asbestos in 1976, which the expert committee accepted and published in 1977 as *IARC Monograph* Volume 14, a similar conclusion was stated: "Many pleural and peritoneal mesotheliomas have been observed after occupational exposure to crocidolite, amosite and chrysotile." Since then—more than 30 years—science has not changed its opinion that all forms of asbestos, including chrysotile, cause mesothelioma.

In fact, in the article that is the subject of the Editor's Summary, Tse et al. (2010) did not indicate that chrysotile is not a cause of mesothelioma; on the contrary, they stated the following:

Although the mesothelioma incidence is anticipated to decline in the coming decades, it may not decrease to background risk levels given that chrysotile consumption has not been banned under the current legislation and that secondary asbestos exposure from the environment will likely continue. Nevertheless, the hypotheses generated from this ecologic study need further confirmation by subsequent analytic studies. The

present study provides supportive evidence for an immediate and global ban on asbestos use.

I hope that future Editor's Summaries will reflect the conclusions of the article and not put forth statements that are not supported by mainstream science. I also support the conclusion of Tse et al. (2010) for "an immediate and global ban on asbestos use."

*The author testifies in asbestos litigation on behalf of plaintiffs.*

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*Editor's Note: We appreciate Lemen's concern about the incorrect statement that was included in the original Editor's Summary for Tse et al. (2010), and we regret the error. The Editor's Summary has been corrected in the online version of the paper, and an erratum was published in the June issue of EHP [118:A240 (2010)]; the text of the erratum is included below:*

*The Editor's Summary for the article "Are Current or Future Mesothelioma Epidemics in Hong Kong the Tragic Legacy of Uncontrolled Use of Asbestos in the Past?" by Tse et al. [Environ Health Perspect 118:382–386 (2010); doi:10.1289/ehp.0900868], has been corrected online: specifically, "(which has been implicated but not conclusively established as a cause of mesothelioma)" has been deleted.*

## The Role of DDT in Malaria Control

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The letter "DDT and Malaria Control" (Tren and Roberts 2010) is the latest in a long string of opinion pieces placed by authors associated with Africa Fighting Malaria (AFM). Appearing in both the popular media (e.g., AFM 2006; Bate 2009; Bate and De Lorenzo 2007; Roberts 2007a; Tren 2002) and scientific literature (e.g.,

Attaran et al. 2000; Roberts 2001, 2007b; Roberts et al. 2000, 2004; Tren 2009), these articles and letters reduce the complex issue of malaria control to a single, dichotomous choice between DDT and malaria. Framing the issue in this manner is a dangerous oversimplification and an distraction from the critical dialog on how to effectively combat malaria around the world—particularly in African communities.

The question that AFM and malaria control experts must ask is not "Which is worse, malaria or DDT?" but rather "What are the best tools to deploy for malaria control in a given situation, taking into account the on-the-ground challenges and needs, efficacy, cost, and collateral effects—both positive and negative—to human health and the environment, as well as the uncertainties associated with all these considerations?"

Tren and Roberts (2010) briefly acknowledged that alternatives to DDT exist (while denigrating them as "supposed solutions"), but in typical fashion they focused most of their letter on the chemical, arguing that the health effects of malaria are much worse than those of DDT exposure. As malaria professionals we are well aware of the dire health consequences of malaria, but also of DDT. The challenge before us is therefore to determine how much weight to give to vector control within the broader context of a malaria control program; within vector control, how much weight to allot to nets versus indoor residual spraying (IRS); and within IRS, how much weight to give to DDT or some other chemical.

These decisions are indeed complex and location specific. In this regard, van den Berg's commentary, "Global Status of DDT and Its Alternatives for Use in Vector Control to Prevent Disease" (van den Berg 2009), is a most useful contribution. In contrast, Tren and Roberts' (2010) advice that "van den Berg's concerns should be ignored" strikes us as reckless and irresponsible.

In 2006, Allan Schapira, former coordinator of vector control and prevention of World Health Organization's Global Malaria Programme, observed that malaria control discussions had become "polluted," and warned, "The renewed interest in indoor residual spraying could lead to interminable debates in countries about the pros and cons of DDT" (Schapira 2006). However well intentioned, Tren and Roberts (2010)—as with much of AFM's output—do more to fuel those "interminable debates" than to meaningfully inform decisions that will save people's lives.

*H.R.H. is employed by the Millennium Institute, a nonprofit organization; CM is employed by icipe (International Center for Insect Physiology and Ecology), Nairobi, Kenya.*

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## DDT in Malaria Control: Roberts and Tren Respond

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Herren and Mbogo's critique of our response (Tren and Roberts 2010) to van den Berg (2009) is lacking in substance. In their letter, they attack our work by characterizing our advocacy for using DDT to control malaria as a distraction from larger malaria control issues. These authors apparently discount the fact that some African countries are presently making highly effective use of DDT to reduce both malaria deaths and malaria infections. Countries that use DDT benefit from its spatial repellent action that stops mosquitoes from entering houses and transmitting disease, and no alternative insecticide does this (Roberts and

Tren 2010). In addition, Herren and Mbogo apparently do not understand that our advocacy is consistent with that exhibited by the malaria control community, with hundreds signing a petition to prevent DDT elimination through Stockholm Convention negotiations. If DDT had been eliminated, countries presently using DDT would have been deprived of its benefits for protecting health and saving lives. Herren and Mbogo claim that our response to van den Berg's commentary (van den Berg 2009) was fixated on DDT, in lieu of addressing the larger issues of what should be done to control malaria. In our letter (Roberts and Tren 2010), we addressed what we considered to be an attack on DDT use. How could we have responded without addressing the issues in van den Berg's commentary?

Herren and Mbogo mischaracterize our position vis-à-vis DDT and alternative insecticides by asserting that we are reducing the malaria control debate to a simplistic equation of malaria or DDT. In fact, we have a public record of supporting the use of insecticide-treated nets and the use of alternative insecticides for malaria control. However, we have repeatedly emphasized that, for obvious reasons, insecticide-treated nets are not the only solution for malaria control. In fact, we object to a theme of nets and nets alone as much as we would object to a theme of DDT and DDT alone. Basically, there is no single-solution approach to malaria control. All tools are needed—not just those that are currently in vogue.

Herren and Mbogo state that they are fully aware that malaria is a worse outcome than possible health effects of DDT. We agree with them and appreciate their willingness to admit this, because their admission opposes published speculations that DDT might be causing more harm than good (Chen and Rogan 2003).

Herren and Mbogo conclude that we “do more to fuel those ‘interminable debates’ [DDT or no DDT for malaria control] than to meaningfully inform decisions that will save people's lives.” It seems that these authors ignore the fundamental fact that we do not elaborate on alternative approaches to malaria control because the alternatives are not presently under threat of elimination. The alternatives are being used and should continue to be used, but the future is far less certain for DDT. Advocacy saved DDT from being eliminated during the original negotiations for the Stockholm Convention, and lives are being saved and diseases prevented as a consequence. The idea that the threat is over and that DDT is now available to those countries making effective use of it is wrong. The Stockholm Convention Secretariat is now planning to stop all production of DDT in 2017 and eliminate it entirely from use in malaria control programs in 2020 (UN Environment Program 2010).

The Stockholm Convention Secretariat plans to prevent future uses of DDT, even though there is no cost-effective replacement for DDT. Given these circumstances, Herren and Mbogo should expect the interminable debates to become even more polemic in the future.

As for the big issues of what should be done to control malaria, our position is clear: Decisions should be based on scientific evidence of what actually works, on local circumstances, and on what proves to be the most cost-effective in terms of reducing disease and preventing human deaths.

*R.T. runs a policy and advocacy group, Africa Fighting Malaria, and both R.T. and D.R. serve on the board of Africa Fighting Malaria. The organization has offices in South Africa and the United States and conducts critical analysis of malaria control programs and funding agencies and strive to build more transparent, accountable, and effective malaria control programs. Africa Fighting Malaria has worked to defend the decisions of malaria control programs to use DDT and to argue for a sound, scientific assessment of the chemical. The organization has a policy of not accepting funds from the insecticides industry and has never received any donations from this sector.*

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## Traffic-Related Air Pollution and Childhood Asthma

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We congratulate Clark et al. (2010) for their interesting article concerning traffic-related air pollution and asthma in children. They examined early-life (*in utero* and during the first year of life) exposure to traffic-related air pollution in a large population-based study

(a nested case-control study including nearly 3,500 children). The authors found an association between elevated early-life exposure to traffic-related air pollution and a higher risk of asthma in preschool-aged children. However, Clark et al. (2010) address aspects, raise questions, and give results that deserve further comment—both concerning specific items and general “structural” criteria used in epidemiological studies on adverse health effects from air pollution.

Recent reports have suggested that individual susceptibility could play a previously unsuspected role in the occurrence of diseases (Cetta et al. 2009a), perhaps a role greater than that of the intrinsic toxicity of pollutants (Cetta et al. 2009b). This could explain, at least in part, why it is so difficult to determine a precise threshold concentration that is harmful or safe for each individual (Cetta et al. 2007). But this is just one side of the question.

The main question is that, in the absence of adequate and specific markers of exposure, effect and susceptibility, the linear dose and effect model, and the concomitant pollutant concentration and disease occurrence relationship cannot explain the complexity of the phenomenon of host-particle interactions. In particular, initial cell alterations (e.g., oxidative stress, DNA adduct formation) rarely turn into permanent tissue damage and evident disease because of host repair and defence mechanisms.

In their article Clark et al. (2010) noted another important aspect that should be considered when comparing pollutant concentrations with the burden of deleterious effects, both at the individual and population levels: acute effects of peak concentrations of pollutants that lead to acute admission to hospital and the chronic damage that causes long-term effects. In fact, we should consider both of these as separate entities. However, we also should consider the effect of air pollution

on newborns, which greatly depends on individual susceptibility—either congenital or acquired. This could play a major role in future outcomes and shed new light on the peculiar pathophysiological mechanisms of most pollution-related diseases. Clark et al. (2010) correctly outlined the asynchronism and the delay (0–4 years) between the initial pathogenetic exposure to pollutants (*in utero* or during the first year of life) and the occurrence and detectability of clinically relevant asthma. This further adds to the complexity of host-particle interactions.

There are three issues that should be taken into account in developmental epidemiology studies such as that by Clark et al. (2010). First, epidemiological studies that concomitantly evaluate pollutant concentration and detectable diseases or hospital admissions usually neglect the perinatal damage in fetuses and newborns, which is not immediately detectable but is a delayed manifestation.

Second, perinatal damage from air pollution deserves further attention and detailed analysis because it includes fetal malformations, birth defects, and developmental alterations of newborns. Injury from perinatal air pollution exposure could also be responsible for the increased proportion of unsusceptible individuals who, because of their exposure to pollutants during the susceptibility window and because of epigenetic alterations due to environmental factors, will become susceptible. Epigenetic alterations could also transfer this susceptibility to future generations, leading to individuals developing not only asthma at 4 years of age but also respiratory, cardiovascular or systemic diseases  $\geq 20$  years later.

Third, clinical and pathophysiological details are not “details” but basic issues and questions—still unsolved—that should be primary goals for future research. They are critical to improving design of epidemiologic

studies and to selecting appropriate models, which should also include biological and pathophysiological parameters and variables because they significantly affect clinical outcomes.

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*Editor's note: In accordance with journal policy, Clark et al. were asked whether they wanted to respond to this letter, but they chose not to do so.*

# Teachers

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EXPLORING ENVIRONMENTAL HEALTH PERSPECTIVES

#### LESSON

## Eyes: Windows to the World

Summary: Students read and discuss an article titled "Eyes: Windows to the World" by David S. Saper. This article explores the role of the eye in human health and the impact of environmental factors on eye health. The article is suitable for use in a classroom setting.

**EHP Article:** <http://ehpnet1.niehs.nih.gov/docs/2006/2006-10-10-eyes/windows-to-the-world/saper/abstract.html>

**Objectives:**

- By the end of this lesson students should be able to:
- 1. identify environmental factors that affect eye health
- 2. relate eye health to broader concepts of environmental health
- 3. demonstrate knowledge of global eye health issues and potential future public action

**Class Time:** 10-12

**Grade Level:** 10-12

**Subjects Addressed:** Anatomy/Physiology, Biology, Environmental Health, Photography, Public Health

**Prepping the Lesson (30-60 minutes)**

**INSTRUCTIONS:**

- 1. Download the article March 2006 *EHP* Student Edition at <http://ehpnet1.niehs.nih.gov/docs/2006/2006-10-10-eyes/windows-to-the-world/saper/abstract.html>
- 2. Read the article and the Background Information section of the lesson.
- 3. Make copies of the Student Instructions and article.
- 4. Decide whether it will be necessary for students to use school photography equipment.
- 5. Check out cameras and coordinate with appropriate staff.
- 6. Determine whether students will be allowed to utilize live images of the Internet using printed materials.
- 7. Collect scrap magazines for distribution, if necessary.

**MATERIALS (per student):**

- 1 copy of *EHP* Student Edition, March 2006, 1 copy of "Eyes on Vision Through the World"
- 1 copy of the Student Instructions
- Access to computer if students will use online pages
- Supplies (as necessary) to create finished page layout:
- Photo printer
- Paper
- Scissors

**Group:** 10-12

### ehp

EXPLORING ENVIRONMENTAL HEALTH PERSPECTIVES

#### LESSON

## Mapping the Air in Your School

Summary: Students read the article "Mapping the Air in Your School" by David S. Saper. This article explores the role of the air in human health and the impact of environmental factors on air quality. The article is suitable for use in a classroom setting.

**EHP Article:** <http://ehpnet1.niehs.nih.gov/docs/2006/2006-10-10-mapping-the-air-in-your-school/saper/abstract.html>

**Objectives:**

- By the end of this lesson students should be able to:
- 1. explain how indoor air temperature and relative humidity can affect human health
- 2. define and measure relative humidity
- 3. explain indoor air temperature and relative humidity measurement and indicators of indoor air quality problems

**Class Time:** 1 hour (or more if data are collected on several days)

**Grade Level:** 9-12

**Subjects Addressed:** Biology, Chemistry, General Science, Physical Science, Environmental Health

**Prepping the Lesson (15 minutes)**

**INSTRUCTIONS:**

- 1. Obtain a class set of *EHP* Student Edition, August 2005, or download "Beyond the Beach: Mapping the Air in Your School" at <http://ehpnet1.niehs.nih.gov/docs/2005/2005-10-10-beyond-the-beach/mapping-the-air-in-your-school/saper/abstract.html> and make copies.
- 2. Make copies of the Student Instructions.
- 3. Assemble the materials needed for the laboratory activity.
- 4. Review the article and the Background Information section of the lesson.
- 5. Obtain permission as needed from school and/or district administration to conduct the activity.
- 6. Decide whether air means if any means in the school and/or any activity they are prepared to do.
- 7. Obtain permission as needed from school and/or district administration to conduct the activity.
- 8. Decide whether you want to conduct the relative humidity and temperature measurements as well as the air quality measurements. If you want to do the air quality measurements, you will need to use an air quality monitor. You will need to use an air quality monitor. You will need to use an air quality monitor.
- 9. Obtain permission as needed from school and/or district administration to conduct the activity.
- 10. Obtain permission as needed from school and/or district administration to conduct the activity.

**MATERIALS (per student):**

- 1 copy of *EHP* Student Edition, August 2005, 1 copy of "Beyond the Beach: Mapping the Air in Your School"
- 1 copy of the Student Instructions
- Access to computer if students will use online pages
- Supplies (as necessary) to create finished page layout:
- Photo printer
- Paper
- Scissors

**Group:** 9-12

### ehp

EXPLORING ENVIRONMENTAL HEALTH PERSPECTIVES

#### LESSON

## Is Environmental Health a Basic Human Right?

Summary: In this lesson, students develop a concept about what it means to "have health" and "have a right to health." This article explores the role of the environment in human health and the impact of environmental factors on health. The article is suitable for use in a classroom setting.

**EHP Article:** <http://ehpnet1.niehs.nih.gov/docs/2006/2006-10-10-is-environmental-health-a-basic-human-right/saper/abstract.html>

**Objectives:**

- By the end of this lesson, students should be able to:
- 1. identify some "basic human rights" as defined by the United Nations and others.
- 2. describe the history of the concept of "basic human rights" as defined by the United Nations and others.
- 3. describe the importance of including the right to a clean environment in international human rights declarations.

**Class Time:** 1-2 hours

**Grade Level:** 12-18

**Subjects Addressed:** Environmental Health, Social Science, History

**Prepping the Lesson (15 minutes)**

**INSTRUCTIONS:**

- 1. Obtain a class set of *EHP* Student Edition, March 2005, or download the article at <http://ehpnet1.niehs.nih.gov/docs/2005/2005-10-10-is-environmental-health-a-basic-human-right/saper/abstract.html>
- 2. Make copies of the Student Instructions.
- 3. Assemble the materials needed for the laboratory activity.
- 4. Review the article and the Background Information section of the lesson.
- 5. Obtain permission as needed from school and/or district administration to conduct the activity.
- 6. Decide whether air means if any means in the school and/or any activity they are prepared to do.
- 7. Obtain permission as needed from school and/or district administration to conduct the activity.

**MATERIALS (per student):**

- 1 copy of *EHP* Student Edition, March 2005, 1 copy of the article, "Is Environmental Health a Basic Human Right?"
- 1 copy of the Student Instructions
- Access to computer if students will use online pages
- Supplies (as necessary) to create finished page layout:
- Photo printer
- Paper
- Scissors

**Group:** 12-18

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